Eye Movement Direction and the Lucid Dreaming Ability

Jayne Gackenbach
University of Northern Iowa

In conjunction with an experiment assess-ing the vestibular sensitivity of frequently lucid dreamers as measured by caloric nystagmus (Gackenbach, Sachau & Rokes, 1982), spontaneous nystagmus or baseline eye movement data were obtained. This is a report on the results and implications of this baseline measure.

Method.

Subjects

Prescreening bad been carried out on 707 Introductory Psychology students at a large midwestern university. Of these 40 female frequent (one or more lucid dreams per month) lucid dreamers, 35 male frequent lucid dreamers, 61 female infrequent (once in a lifetime to several times per year) lucid dreamers, 72 male infrequent lucid dreamers were selected who provided both handedness information and a transcript of a lucid dream, which demonstrated clear understanding of the concept of lucidity. Although transcripts of dreams were provided by many of the remaining 344 subjects, they were judged to be either clearly not a lucid dream, questionably lucid or partially lucid (i.e., false awakenings or suspecting it's a dream but concluding that it is not). The key indicate for identifying a dream as lucid was the inclusion of some kind of recognition phrase (i.e., 'then I realized it was only a dream'). Additionally, 73 female nonlucid dreamers and 82 male nonlucid dreamers were able to be classified.

Forty-eight of these primarily right handers were selected from the afore-mentioned sex x dreamer cells (8/cell) who had no history of severe ear problems (Collins, 1965), severe motion sickness (Collins, 1965), severe bodily injury which would affect balance performance (Witkin, Lewis, Hertzman, Machover, Meissner & Wapner, 1954) and visual problems not correctable by glasses (Suttie, 1973).

Instruments

Lucid Dreaming Questionnaire (LDQ: Gackenbach, 1978). This is a series of questions about lucid dreaming and lucid dreams. One item on this scale asks about a subject's history of dream recall. Subject's response to this item was used as a covariate in all data analyses.

Balance History Questions (BHQ). This scale questioned potential subjects about their history of balance related disorders (i.e., ear problems, physical handicaps, vision problems not correctable by glasses and motion sickness history).

Apparatus

An R-511A Dynograph with a 9806A Input Coupler and three electrodes (one ground and one for each eye) was used to measure nystagmus. The electrodes were fixed to the outer canthus of each eye in order to measure horizontal movement of the eyes. Chart speed was 10mm/second and time per event was 1/second.

Procedure

All potential subjects participated in the prescreening phase of this research project I in groups of 50 to 150. During these mass testings they filled out the LDQ and BHQ. They also indicated the frequency with which they experience dream lucidity as well as provided a transcript of a lucid dream they had experienced. Their handedness was also ascertained.

Eight subjects per sex x dreamer cell for a total of 48 students were contacted and asked to participate in the caloric irrigation task. They were instructed to take no drugs, including caffeine prior to experimental participation. Upon entering the experimental setting, subjects were given a general overview of the experimental procedure. Of concern to this paper was the assessment of spontaneous nystagmus or baseline eye movements. As per Spector (1967), the experimental participant was asked to fix their gaze straight ahead, gaze right and gaze left at marks placed 10 degree from their center gaze and close their eyes. Each of these tasks lasted for 15 seconds and was done with lights on and lights off, in that order.

Results

Two 2 (sex of subject; male and female) x 3 (type of dreamer; frequent, infrequent and never) x 2 (lights; on and off) x 4 (eyes instructed to move; straight, right, left, and closed) x 2 (eyes direction; right and left) analyses of covariance with self-reported dream recall as the covariate were computed on the number of spontaneously emitted beats/second and on the amplitude/beat. Only main effects and interactions involving the three within subject variables reached significance for beats. These included main effects for lights ($F(1,42)=29.35$, $p<.00001$) and eye instructions ($F(3,126)=14.40$, $p<.00001$) and interactions between lights and eye instructions ($F(3,126)=3.88$, $p<.01$), eye instruction and eye direction ($F(3,126)=27.66$, $p<.00001$) and lights, eye instruction and eye direction ($F(3,126)=3.15$, $p<.03$).

For the analysis on amplitude, the dreamer type by eye direction interaction was significant ($F(2,42)=5.01$, $p<.0l$) as were several other effects not involving dreamer type. These included an eye instructions ($F(3,126):24.13$, $p<.00001$) main effect and an interaction between eye instructions and eye direction ($F(3,126)=74.72$, $p<.00001$). It can be seen in Figure 1 that the frequent lucid dreamers accounted for this interaction. That

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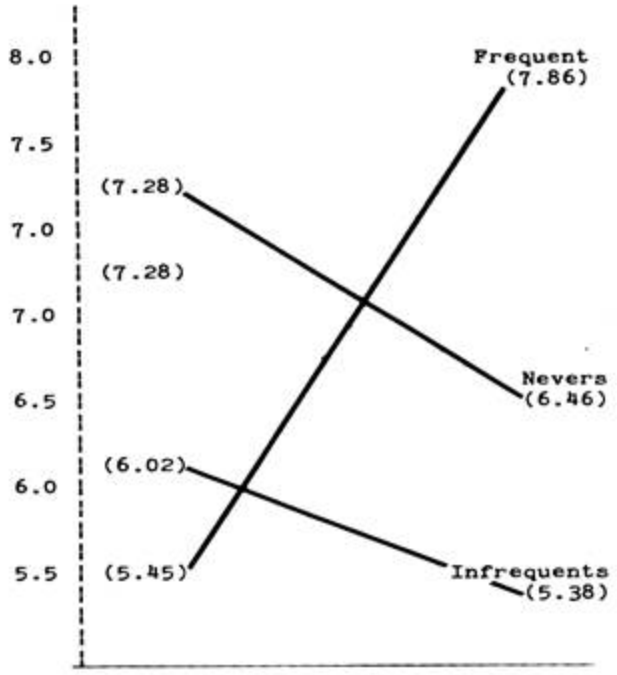
is, they showed a significant (Duncan post-hoc q=5.95, p<.O1) left bias in the amplitude of their spontaneously generated nystagmus. Post—hoc tests on nonlucid and infrequently lucid dreamers showed no such side preference.

Figure 1

Mean Spontaneous Nystagmus Amplitude by Type of Dreamer and Direction of eye Movement



Right Left

Direction of Eye Movement

Discussion

If was found that those who report frequently experiencing dream lucidity tend to evidence more leftward amplitude than rigbtward amplitude. The other two types of dreamers showed no side preference in eye movement amplitude. This is consistent with findings that hypnotic susceptibility (Eakan, 1969; DeWitt & Averill, 1976; Our & Our, 1971!), clear mental imagery (Bakan, 1969), interference on the Stroop test (Bakan & Shotland, 1969), frequency of daydreaming (Meskin & Singer, 197~I) and higher verval abilities (Bakan, 1971) are all associated with left eye movers and dream lucidity ability (Dane, 1961!; Bearne, 1978; Gackenbach, Snyder, Moxelvey, McWilliams, George &

Rodenelli, 1981; Gackenbach, Curren, LaBerge, Davidson, & Maxwell, 1983).

However, work with eye movement and lucid dreaming abilities and psychological differentiation are conflicting. That is, left movers have been found to be field dependent (Dewitt & Averill, 1976; Pierro & Goldberger, 1982) while these left moving frequent lucid dreamers have been reported as field independent (Gackenbach, Bellman, Boyt & LaBerge, in press). This discrepancy could be due to differences in measurement. Eye movement direction is typically assessed as the number of beats in one direction in response to a series of questions determined by the visual observation of the interviewer (Pierro & Goldberger, 1962). In this study there were no side by dreamer type differences for beats/second and there was no content interview. Distinctions between beats and amplitude are not typically made in the eye movement literature. It may simply be that lucid dreamers represent a particular substrata of left eye movers who are uniquely field independent but similar to other left eye movers in their susceptibility to suggestion and the Stroop effect and experience of vivid imagery and frequent daydreamers.

Additional1y, all of the aforementioned, except the Stroop effect, have been thought to imply superior right hemisphere functioning, although the findings for field independence are somewhat $_0$ontradictory (Garrick, 1978; Dewitt & Averill, 1976; Meskin & Singer, 1974). In fact, Kinsbourne (1970) and Bakan (1971) suggest that the movement of the eyes is the result of activation of the contralateral hemisphere especially in right handed males. Relatedly, Snyder and Gackenbach (1981) found, 'that females who frequently experience lucid dreams, regardless of their handedness, have a greater degree of unilateral cerebral speech organization than do females who never or infrequently experience such dreams (p. 154)." Therefore, unlike their dreamer counterparts, frequently lucid women evidence a cerebral lateralization like right handed males and are consequently more prone to consistency in eye movement direction (Duke, 1968).

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